

Robot Soccer Rules 2017

Equipment

- Robots must fit in a can with an 8-inch diameter and 10-inch height.
- Each robot must wear a standard uniform on top, and it must be attached securely so that it does not shift or fall off during play. Velcro fasteners are recommended, since the robot may need to wear a different uniform for each game.
- Other than the uniform, all parts of the robot visible from the overhead camera must be black. All cables, wires, batteries, etc. must remain inside the robot and out of view from the overhead camera. Side panels must be sturdy enough to keep the ball from being lodged inside the robot during play. Robots must not drop parts on the field during play.
- The ball is a standard (unpainted) golf ball; the same ball will be used for all games.
- Robots are not allowed to fix the ball to their body, or to enclose the ball in any way that prevents access by other players. 80% of the area of the ball must be outside the convex hull of the robot, when viewed from the side at a perpendicular angle.
- Kickers are permitted, as are dribbling devices that exert backspin on the ball (to maintain contact with the robot). No robot can use adhesives such as glue or tape for purposes of controlling the ball or constructing a dribbler. A team that kicks the ball out of play will be penalized.

Operation

- Robots must operate autonomously. Team members may not touch the ball, robots or their team computers during play once the robots are placed on the field.
- Robots must respond quickly and consistently to ROS `GameState` messages from the Robot Soccer Referee. There are essentially four directives that the robots must respond to: Play, Pause, Normal Reset, and Penalty Reset.
 - Robots must wait to begin play until the Play flag becomes True.
 - During play, the robots must freeze in place when the Play flag becomes False.
 - Normal Reset tells the robots to (autonomously) position themselves for the start of normal play. Robots on offense may be anywhere on their half of the field. Robots on defense must be on their half of the field but at least 12 inches from the center point (where the ball will be placed).
 - Penalty Reset tells the robots to (autonomously) position themselves for the start of a penalty play. Robots receiving this directive will be on defense in a position of disadvantage: the positions taken by the robots will be on their half, on opposite sides of the field, within 6 inches of the center line, and within 6 inches of a side wall. (By design, this leaves the middle open for the other team.)
- Robots must be designed and operated in such a way that they do not cause harm to other robots, the field, or human spectators. Robots are to avoid collisions with other robots, even when resetting to their home positions (in which case they should also avoid hitting the ball). Incidental contact is inevitable, but robots that repeatedly cause collisions with the other team will be penalized.

Uniforms

Note: These rules were used Winter 2016, and they seemed to work well, but uniform details can be changed if at least 6 of the 7 teams agree.

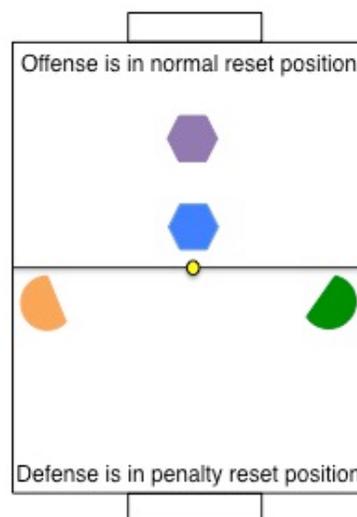
- Uniforms will be made out of flat construction paper such that all teams use identical colors and the uniform surface is not shiny.

- Each of the four robots on the field will have a unique color assigned. The colors we use will depend on available construction paper, the final color of the field, and the ball color that is chosen. For Winter 2016, the home team was assigned blue and purple, and the away team was assigned orange and green.
- Each uniform will consist of two areas of the assigned color that are separated by a black stripe. The areas will be unequal in size; the smaller of the two will be placed at the front of the robot. Example uniforms are shown below for robots of different shapes.



Play

- There will be a 120 second break between games. If the schedule permits, short grace periods (not to exceed 15 seconds) may be granted if a team is not quite ready to go.
- Normal play commences with each team on its half and the ball in the center of the field. When a penalty is called, play resumes with the penalized team in the penalty reset position. Normal and penalty reset positions are illustrated in the figure below.
- To signal that the team is ready to start play, one team member should raise his/her hand. Play will be started through the Robot Soccer Referee.
- A game will consist of two halves, each 120 seconds in length. The clock will stop during timeouts and resets.
- Each team can request one 15-second timeout each half, but the referee may not grant it immediately. In general, team timeouts will be granted only after a goal or when play is virtually at a standstill. At their sole discretion, referees may call a 15-second technical timeout when the ball is not near a goal and nothing is happening. During timeouts, humans may touch the robots. After a timeout, play will resume from the normal reset position. (If play comes to a standstill, the referee may also elect to manually move the ball away from its current position.)
- There will be a 60 second break between halves. Team members may touch their robots during halftime. Teams will switch ends of the field for the second half.



- The offside rule will not apply in our competition.
- A goal is scored when the ball breaks the plane of the front of the goal. The referee has final say whether a goal was scored or not.
- Teams will not have a designated goalie, but at most one defensive robot can be in the goal box at a time. It is a violation if a second defensive robot is in the goal box (determined by its center of mass) for more than 3 seconds.
- If a game ends in a tie, the outcome will be determined by a sudden death overtime, which will begin after a 60 second break (during which the robots may be touched). Play will end when the first overtime goal is scored. Alternately, at any point after 120 seconds of overtime, the referee may stop play and determine the winner by coin toss (called by the home team). Whenever possible, we'll play games until we have a winner, but our tournaments will have scheduling constraints.

Penalties

- As mentioned above, penalties may be called for dropping parts on the field, kicking the ball out of play, repeatedly causing collisions, or having too many defenders in the goal area. Penalties will be called at the sole discretion of the referee.
- Under normal circumstances, the first violation per game will be considered a warning. In this case, play will be stopped, the offending team will be warned, and the teams will reset to the normal starting positions. As a general rule, play will not be stopped as long as the non-offending team has an advantage.
- On subsequent violations, the referee will stop play, direct the penalized team to do a penalty reset, and direct the non-penalized team to do a normal reset. By design, this gives the non-penalized team a very good chance to score.

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